



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/593,333

09/19/2006

Jan-Martin Loning

12810-00347-US1

9902

30678

7590

09/17/2010

CONNOLLY BOVE LODGE & HUTZ LLP

1875 EYE STREET, N.W.

SUITE 1100

WASHINGTON, DC 20006

EXAMINER

MCKENZIE, THOMAS B

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

09/17/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,333	Applicant(s) LONING ET AL.	
	Examiner THOMAS BENNETT MCKENZIE	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 08/12/2010 have been fully considered but they are not persuasive.
2. In the Final Rejection mailed 03/11/2010, **claims 11-14 and 17-19** were rejected under 35 U.S.C. 103(a) as being unpatentable over Janzen et al, DD 145540A while **claim 15** was rejected under 35 U.S.C. 103(a) as being unpatentable over Janzen in view of Fike et al, USP 6,312,503 and **claim 16** was rejected under 35 U.S.C. 103(a) as being unpatentable over Janzen in view of Serenkov et al, DD 160829.
3. On page 2 of the Remarks, Applicant argues that repeating the DMT removal process of Janzen would not read on the process claimed in **claim 11** of instant Application since **claim 11** is for a process to cool and purify gas streams and both process steps cannot be carried out at the same temperature. The Examiner respectfully disagrees.
4. Janzen teaches a method for removing dimethyl terephthalate (DMT) sublimate from an inert gas stream. DMT is used in the production of polyethylene terephthalate (PETP). In this production process, DMT is melted and intermediately stored in a vessel before being used to make PETP. In order to keep the melted, stored DMT from oxidizing, the storage vessel is fogged with an inert gas. While fogging, this inert gas stream collects DMT sublimate. To recover the sublimate, Janzen teaches using a sublimate separator (page 3, lines 5-10, under "Nature of the invention"). One stage of the sublimate separator consists of a glycol trap, which uses glycol within a temperature

Art Unit: 1797

range of 20-160°C. The glycol trap removes the DMT sublimate from the inert gas, and the glycol/DMT mixture is returned to the production process (page 3, lines 5-10). The Examiner believes the inert gas leaving the storage vessel is around 170°C since this is the temperature of the DMT in the vessel (page 4, lines 1-5, under "Example 1"). When contacted with glycol from 20-160°C, the inert gas would presumably cool. The gas stream is also purified in the glycol trap since the glycol trap collects DMT sublimate (page 3, lines 5-10). Therefore the process of Janzen both cools and purifies the inert gas stream.

5. The courts have held that the mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art. See *In re Harza*, 124 USPQ 378 (CCPA 1960) (see MPEP § 2144.04). In this case it would have been obvious to one of ordinary skill in the art at the time of the invention to pass the inert gas through the glycol trap twice in order to ensure complete recovery of the DMT sublimate.

6. On page 3 of the Remarks, Applicant argues that Janzen does not teach a quenching process since the contact time between the glycol in the glycol trap and the inert gas is not sufficient to cool the gas, due to the circumstance of the apparatus, and if such contact times were employed, cooling would not be appreciable nor the mode of operation economical. The Examiner disagrees with Applicant's assertion that cooling does not take place in the glycol trap (for reasons stated above). Further the Examiner does not understand the Applicant's assumption that the contact time between glycol and inert gas would not be sufficient to cool the gas. The Examiner presumes that if the

Art Unit: 1797

contact time is sufficient to remove DMT sublimate from the inert gas, then the contact time would also be sufficient to cool the gas stream, even slightly. The Examiner also considers this cooling process as to be a quenching process since the Applicant has defined "quenching" as "cooled by means of a cold liquid" on the fourth page of the Remarks.

7. Also on page 3 of the Remarks, Applicant describes the Declaration by Dr. Loening that was submitted on 08/12/2010. The Examiner has considered this document, but does not find it convincing to overcome the rejection over Jansen since the scope of the Declaration is different from that of the claimed invention. Specifically, the Declaration describes a two-stage cooling and purification process where the first stage is 124°C and the second stage is 60°C. While these temperatures are within the temperature ranges as claimed in **claim 11**, **claim 11** also includes temperatures which are outside of this range.

8. For at least these reasons, the rejection of **claim 11** over Jansen stands.

9. On page four of the Remarks, Applicant argues that Janzen in view of Fike does not render obvious instant Invention as claimed in **claim 15**. The Examiner agrees with the Applicant with respect to **claim 15**.

10. However, the Examiner believes the dihydroxy compound used in Janzen (glycol) is a diol having from 2 to 6 carbons. Janzen teaches returning the mixture of DMT and glycol to the PETP production process (page 3, lines 5-10). While glycol is a generic term for a diol, ethylene glycol is typically used with DMT in the production of

Art Unit: 1797

PETP (as evidenced by Kulkarni, US Pre-Grant Publication 2004/0044172, paragraph

8). For at least these reasons, the rejection of **claim 15** stands.

11. Further on page four of the Remarks, Applicant argues that Janzen in view of Serenkov does not render instant Invention as claimed in **claim 16**. Although the Examiner agrees with the Applicant's reasoning, a new reason for rejection is presented below.

12. The Examiner would like to remind the Applicant that **claims 17-19** are rejected under 103(a) over Janzen alone, not in view of Serenkov. As such the rejection of these claims still stands.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. **Claims 11-15 and 17-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Janzen et al, DD145540A (Janzen).

Art Unit: 1797

16. Regarding **claim 11**, Janzen substantially teaches a process for purifying (p. 2, first paragraph) and cooling (p. 4, first paragraph and p. 3, second paragraph) a gas stream comprising a dialkyl ester A) of an aromatic dicarboxylic acid (DMT, p. 2, first paragraph), which comprises treating the gas stream with a dihydroxy compound B) (glycol, p.3, second paragraph) at a temperature between 20-160°C which reads on the claimed range of a temperature less than/equal to the melting point of the dialkyl ester A) in a first stage (p. 3, second paragraph) wherein the dihydroxy compound B) (glycol) has a temperature between 20-160°C (p.3, second paragraph) which reads on the claimed range of less than/equal to 140°C in the first stage (p.3, second paragraph).

17. Note that Janzen does not teach treating the gas stream with an aliphatic dihydroxy compound B) at above the melting point of the dihydroxy compound B) in at least one second stage, wherein the dihydroxy compound B) has a temperature from 20 to 80°C in the second stage. However, the object of Janzen is to "ensure complete reuse of DMT sublimate" (p. 3, second paragraph). Additionally, the dihydroxy compound (glycol) of Janzen contacts the dialkyl ester (DMT) in a temperature range between 20-160°C (p. 3, paragraph 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to repeat the first stage cooling within the disclosed temperature range to ensure a high yield recovery.

18. Regarding **claim 12**, Janzen teaches the dialkyl ester A) is an ester of terephthalic acid, isophthalic acid, 2,6-naphthalendicarboxylic acid or mixture thereof (dimethyl terephthalate, p.2, first paragraph). Note that dimethyl terephthalate is an ester of terephthalic acid.

Art Unit: 1797

19. Regarding **claim 13**, Janzen teaches a dialkyl ester A) having alkyl radicals having from 1 to 4 carbon atoms (dimethyl terephthalate, p.2, first paragraph). Note also that dimethyl terephthalate contains two alkyl radical carbon atoms.

20. Regarding **claim 14**, Janzen teaches a the gas stream that is purified to be a laden inert gas stream (Janzen translation, p.2, lines 6-7; p.3, lines 1-2).

21. Regarding **claim 15**, Janzen substantially teaches the limitation of **claim 11**, as described above. Although Janzen does not explicitly teach the dihydroxy compound is a diol having from 2 to 6 carbons, Janzen does teach the dihydroxy compound is glycol. In this case glycol and the dialkyl ester (DMT) are contacted and returned to a reactor where polyethylene terephthalate (PETP) is formed (page 3, lines 5-10). Although glycol is a generic term for a diol, ethylene glycol is well known in the art as a glycol used in PETP production (as evidenced by Kulkarni, US Pre-Grant Publication 2004/0044172). As such, it would have been obvious to one of ordinary skill in the art at the time of the invention for the glycol used in Janzen to be ethylene glycol. Please note that ethylene glycol contains two carbon atoms.

22. Regarding **claim 17**, Janzen et al teaches a dialkyl ester A) used being dimethyl terephthalate ("dimethyl terephthalate", Janzen translation, p.2, line 1).

23. Regarding **claims 18 and 19**, while the reference is silent to the degree of saturation of the gas stream with respect to the dialkyl ester after purification and cooling, note that the claimed amounts are well known in the art for optimal purification and cooling and it would have been obvious to one of ordinary skill in the art at the time the invention was made to so include for this benefit.

24. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Janzen in view of Scott et al, US Pre-Grant Publication 2003/0114062 (Scott).

25. Regarding **claim 16**, Janzen substantially teaches the limitations of **claim 16**, as described above. Although Janzen does not explicitly teach the dihydroxy compound is 1,4-butanediol, Janzen does teach using the dihydroxy (glycol) compound in the formation of PETP (page 3, lines 5-10). 1,4-butanediol is known in the art as the diol used in the reaction process with DMT to form polybutylene terephthalate (Scott, paragraph 22). Scott also teaches that the process used to form PBT is analogous to the process used to form PETP (paragraph 22). Since the process to form PETP and PBT are analogous, and since both processes use DMT, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the process of Janzen in the manufacture of PBT instead of PETP. In such a process, the glycol of Janzen would be 1,4-butanediol since this is the glycol used to form PBT.

26. **Claims 10-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fike et al, USP 6,312,503 (Fike).

27. Regarding **claim 1**, Fike substantially teaches:

28. A process for purifying and cooling a gas stream comprising a dialkyl ester A) of an aromatic dicarboxylic acid ("oligomeric dusts", column 6, lines 1-5), which comprises treating the gas stream with an aliphatic dihydroxy compound B) ("ethylene glycol", column 6, lines 5-10) at a temperature less than/equal to the melting point of the dialkyl ester A) in a 1st stage (45°C, column 6, lines 5-10) and treating the gas stream with an aliphatic dihydroxy compound B) at above the melting point of the dihydroxy compound

Art Unit: 1797

B) in at least one second stage (8°C, column 6, lines 25-30), wherein the dihydroxy compound B) has a temperature less than/equal to 140°C in the first stage (45°C) and has a temperature of 8°C in the second stage (column 6, lines 25-30).

29. While Fike does not explicitly teach a dialkyl ester, instead teaching oligomeric dusts, the Examiner believes these dusts are short chain PETP products since Fike teaches that byproducts which are eventually removed from the gas are first removed in the polymerization process to develop molecular weight of the PETP product (column 1, lines 15-25).

30. Furthermore, even if these oligomeric dusts are not short chain PETP products, they are likely undesirable reaction by-products from the PETP polymerization process. These by-products would likely be a dialkyl ester of an aromatic dicarboxylic acid since PETP is often created in a transesterification reaction between ethylene glycol and DMT or in an esterification reaction between terephthalic acid and ethylene glycol.

31. Additionally, although Fike teaches the second stage has a temperature of 8°C, which is outside of the claimed range of 20-80°C, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the temperature of the second stage in Fike to read on the claimed range of 20-80°C. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The discovery of an optimum value of a known result effective variable, without producing any new or unexpected results, is within the

Art Unit: 1797

ambit of a person of ordinary skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05, II.).

32. Regarding **claim 12**, Fike substantially teaches the dialkyl ester is an ester of terephthalic acid since the production process of Fike is used to create PET and PET generally involves the transesterification of DMT (which is an ester of terephthalic acid) and ethylene glycol. The ester being an ester of terephthalic acid reads on the claimed group of terephthalic acid, isophthalic acid, 2,6-naphthalenedicarboxylic acid or a mixture thereof.

33. Regarding **claim 13**, Fike substantially teaches the limitations of **claim 11**, as described above. Although Fike does not explicitly teach the dialkyl ester has alkyl radicals having from 1 to 4 carbon atoms, Fike does teach removing oligomeric wastes produced in the production of PETP (column 6, lines 1-5). The Examiner believes the oligomeric dusts would contain alkyl radicals with 1 carbon atom since these oligomeric dusts are likely to be short chain PETP products (based on the fact that byproducts are removed in the process to develop molecular weight of the PETP product, column 1, lines 15-25).

34. Regarding **claim 14**, Fike substantially teaches the gas stream which is purified and cooled is a laden inert gas stream (column 2, lines 60-65).

35. Regarding **claim 15**, Fike substantially teaches the dihydroxy compound used is a diol having from 2 to 6 carbon atoms ("ethylene glycol", column 6, lines 5-10) which read on a diol having from 2 to 6 carbon atoms.

Art Unit: 1797

36. Regarding **claims 18 and 19**, while the reference is silent to the degree of saturation of the gas stream with respect to the dialkyl ester after purification and cooling, note that the claimed amounts are well known in the art for optimal purification and cooling and it would have been obvious to one of ordinary skill in the art at the time the invention was made to so include for this benefit.

37. Regarding **claim 20**, Scott substantially teaches the temperature of the second stage is cooler than the temperature of the first stage (column 6, lines 5-10 and 25-30).

38. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fike in view of Scott.

39. Regarding **claim 16**, Fike substantially teaches the limitations of **claim 11**, as described above. Although Fike does not explicitly teach the dihydroxy compound is 1,4-butanediol, Fike is generally concerned with a process for the forming PETP (column 1, lines 15-25). 1,4,-butanediol is known in the art as the diol used in the reaction process with DMT to form polybutylene terephthalate (Scott, paragraph 22). Scott also teaches that the process used to form PBT is analogous to the process used to form PETP (paragraph 22). Since the process to form PETP and PBT are analogous, and since both processes use DMT, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the process of Fike in the manufacture of PBT instead of PETP. In such a process, 1,4-butanediol would be substituted for ethylene glycol since 1,4-butanediol since this is the glycol used to form PBT.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS BENNETT MCKENZIE whose telephone number is (571) 270-5327. The examiner can normally be reached on Monday-Thursday 7:30AM-5:00PM Alt. Friday 7:30AM-4:00PM EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DUANE SMITH can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Duane Smith/
Supervisory Patent Examiner, Art
Unit 1797

TBM